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HEAD START EVALUATION AND RESEARCH CENTER, THE UNIVERSITY OF CHICAGO. REPORT C, COGNITIVE INTERACTION BETWEEN TEACHER AND PUPIL IN A PRESCHOOL SETTING.

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This progress report describes the method used in acquiring the verbal behavior of teachers during class time. The method of acquiring this data is an important part of the larger study concerned with the evaluation and standardization of coding categories for use as an observation and research tool in analyzing teacher behavior. In fact, the categories were derived from research on maternal teaching styles but were adapted to teachers' classroom behavior in preschool situations. The emphasis of this research is on the cognitive interchange between teacher and pupil. The coding categories allow tabulation of the different types of communication used in the classroom. During the initial development of the teacher behavior coding scheme, teacher observation was conducted at two nursery schools, one for low income children and one for high income children. A second observation phase was conducted in three different types of classrooms: (1) a settlement house class, (2) a Montessori class, and (3) two Head Start classes. Each observation session was taped and coded by an observer. The teacher involved wore a cordless microphone and the observer received the broadcast, for purposes of consistent pick up, by earphones. The 17 transcripts taken are being coded and analyzed. Two appendixes at the end of the report enumerate the coding categories. (WD)

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C. Cognitive Interaction Between Teacher and Pupil in a Preschool Setting

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This study is concerned with the evaluation and standardization of coding categories that have been developed for use as an observation and research tool in analyzing teacher behavior. The categories were derived from research on maternal teaching styles conducted by the principal investigators; this project attempted to develop the scales more systematically and apply them to teachers' classroom behavior in preschool situations. As with the previous research, the emphasis is on cognitive interchange rather than love-hostility and autonomy-control dimensions.

It is a methodological study, designed to provide an evaluation of the reliability and feasibility of the coding system under different environmental conditions and to establish the necessary controls for its use. Questions and issues being addressed are the following:

1) Unitizing by "grammatical" or "response" message units.
2) The qualitative and quantitative relationships between coded verbatim transcripts and observer-coded transcripts.
3) Significance of amount of verbalization <u>per se</u> for cognitive stimulation.
4) Individual teacher consistency in verbal output especially in the cognitive area. If the amount of cognitive speech varies, what are the important conditions?

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5) The usefulness of time sampling versus activity sampling. If activity (play vs. games vs. "juice time" vs. rest period) is an important variable, it may be advisable to code (record) at selected times when the teacher's speech will be typical of cognitive elements.

6) The interaction with type of classroom orientation: teacher-traditional (child-directed); structured; specific task-oriented.

The realization and demonstration that varying teaching strategies used by mothers had a significant effect on the learning behavior of their four-year-old children in an experimental learning situation (Hess and Shipman, 1965) gave impetus to our concern to investigate the verbal strategies employed by teachers in the preschool classroom. It was recognized that not all cognitive development proceeds on a verbally mediated level. However, it is accepted that this is one of the most important ways in which conceptual thought is developed and demonstrated. It is also one of the most available for observation. This project is, therefore, focused on the analysis of the teacher's verbal behavior in the classroom.

The project originated in the spring of 1966. It was pursued until January, 1967, when the director went on leave of absence. Except for the transcribing of the recorded classroom sessions, work was not resumed on this project until fall, 1967. The following, therefore, is a progress report rather than a final report on the project.

In evolving the coding categories, all speech was considered important. It is not clear at this time where the line may be drawn

between explicit and implicit cognitive stimulation. We believe there is potential cognitive stimulation contained in speech even when the teacher is not specifically involved in formal teaching situations. For instance, we regard the way in which controlling statements are made as a possible transmitter of a cognitive approach (cf. Bernstein) through the use of "reasoning" or "alternatives" rather than peremptory commands. It may be important whether a teacher asks questions or merely tells the children. One method may demand the use of concepts and the active participation of the child while the other allows him to be passive. It is also felt that at the preschool age we are dealing with what Bruner calls the "pre-cursors" to cognitive development — those attitudes which improve the quality of data processing such as preliminary orientation and focus. Therefore, within this framework we evolved a set of coding categories which allow us to tabulate the different types of communication used in the classroom and which separate the more explicit cognitive statements into increasing levels of complexity.

The first months of the project were used in developing the original coding scheme and in observing in two nursey schools. (One of these was a Head Start class in a low income Negro community; the other a laboratory school in a professional, high income white area.) All speech was divided into four areas: 1) instructive speech, 2) control functions, 3) general communication which has cognitive implications, and 4) neutral statements. The teachers' statements were then coded within each area in terms of the cognitive skills used or demanded. During this pilot period we also investigated the use of a cordless microphone which transmitted to an FM tuner to record on tape all the

teachers' statements and the use of different coding formats by an observer in the classroom. Earlier we had found that a tape recorder is ineffective in picking out a teacher's voice in the complex and noisy nursey school world.

This preliminary classroom observation indicated that meaningful data could be obtained when one used activity or functional sampling, but not time sampling, since the activity structures the data obtained. Preliminary analysis of teacher behaviors in a nursery school setting revealed striking differences in the proportion of cognitive versus non-cognitive (affective, disciplinary) interchange for head teachers and assistant teachers.

In the fall of 1966 four Chicago classes were selected for further observation. These classes were chosen to represent potentially different teaching styles. The first was run by a well-established settlement house and represented the child-centered, permissive atmosphere. The second class was run by a Montessori school along a modified Montessori philosophy. The third and fourth classes were both Head Start classes sponsored by the Chicago Archdiocese which were also part of our evaluation sample. Both might be termed eclectic in approach with differences related to the personality rather than philosophy of the teacher. Three of the schools had a population of deprived Negro children; the Montessori school included middle and lower income white and Negro children.

Seventeen class sessions were taped, with a minimum of three sessions per class. Observations were scheduled to give balanced representation of activity periods. The teachers wore a cordless microphone which transmitted to an FM tuner hooked to a tape recorder. The

teachers did not object to wearing the mike, and it did not seem to interfere with their activity. An observer (Dr. Berry) also kept a log of activity to coordinate with the taped session. The observer experimented with different "on the spot" coding formats but decided to concentrate on a log of activity in order to interpret the tapes accurately. It is important to know where the teacher is and to whom she is speaking. In addition, the activity area and classroom curriculum are important variables which affect the amount and type of speech used. For instance, during free play the teacher seems to make more controlling statements than during juice time. There is likely to be a higher proportion of cognitive statements in the puzzle corner than in the doll corner. We are interested in documenting such variations within a given school as well as between schools of differing philosophy.

It is clear at this point that one cannot adequately survey teacher behavior in a nursery setting without a mechanical assist (such as a microphone). This is particularly true in classrooms where emphasis is put on individual contact (i.e., Montessori, or the extreme child-centered program). It may be possible, however, to avoid the tedious task of transcribing and typing by having the microphones feed into earphones worn by the observer who does the coding. It was found that the observer could not code verbal behavior directly without a mechanical aid, i.e., earphones which picked up the broadcast from the cordless microphone. This, of course, limits the mobility of the observer, but it is necessary if he codes on the scene. Our present preference, however, is to use the observer in the class to write down a simultaneous log of activity and to code directly from the tapes at

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a later time. This avoids losing the data and allows for more studied discriminations, especially in speech which extends over several sentences.

Practical difficulties do arise which affect the quality of the tapes and the amount of verbal behavior intelligible from the tapes. Locations vary in the amount of external broadcast interference on the FM band. Also, size and shape of the classroom can affect the quality of transmission. Despite these technical difficulties, it is felt that the use of a cordless microphone is an absolute necessity in the preschool class. With it one picks up the asides, personal remarks, and comments to the individuals which are components of "style" and which are lost in general observation. (This is particularly true of the teacher who strives for individual communication rather than group speech.)

At present the seventeen transcripts are being coded and analyzed. This is considered a trial coding and it is our intention to refine the categories as we proceed. A tentative change in the categories for explicit cognitive statements is enclosed (see Appendices A and B). It will then be necessary to establish the practical viability and reliability of the categories. This will involve training one or more coder-observers who will use the observational material now available and also test the categories in new observations. When it has been ascertained that the coding categories can be used reliably by different judges, we will analyze them for internal consistency measures on individual teachers, for variations between teachers, and for variations related to activity areas and group structure in the classroom.

Analysis of the data from the Head Start classes will allow

assessment of the similarities and differences between the two observation schemata (i.e., between this coding system and the ORF) and provide more detailed analysis of one aspect of the teacher's behavior, her verbal behavior to the children.

Since the initiation of the teacher observation project, there have been several schemes used in the national Head Start evaluation program which have also tried to focus on the teacher. It appears that the Observation of Substantive Curricular Input (OSCI) developed by Dr. Carolyn Stern has several aspects which can be incorporated into our coding scheme. Although the OSCI does not focus on verbal behavior, the overview of the classroom does give the background information which we feel is necessary to investigate the variables which effect the rate and type of speech. All the observations contain a Context code which could be used instead of the more diffuse "Activity Area" code used in our original categories. It must be noted that the context code is based on what the children are doing. It may be necessary to include new codes which account for teacher behavior when she is not involved with a child. Other codes will no longer be appropriate and will automatically be dropped. However, it seems economical to use a system already in operation whenever possible. Another facet of the OSCI is the documentation of the group structure in the classroom. We feel it is important to know to whom the teacher is talking. Therefore, we shall be working out ways in which these two systems can be used to advantage in the Cognitive Coding.

APPENDIX A

COGNITIVE CODING CATEGORIES FOR TEACHER VERBAL BEHAVIOR

I. Precursors

PR -- Precursor Attitudes

- o - orienting
- m - motivating intellectual interest
- f - focusing on a relevant detail
- ant - setting up an anticipatory pattern of looking ahead which may involve delay

II. Data Processing

IS -- Input in simple form

- lab - labelling
- des - description
- ct - counting
- vc - verbal communication which is generally informative, but not focused (e.g., comment or answer to a question)

DS -- Demand in simple form

- lab - labelling
- des - description
- ct - counting
- vc - verbal communication in form of a question, asking for simple information

IC -- Input Complex

- cogd - cognitive discrimination; all sensual and perceptual comparisons, similarities and differences. Includes more difficult number concepts, as well as other quantitative concepts and references to size and shape.
- enr - enrichment, elaboration, including associations to past and future
- def - formal definition
- sqch - sequence chain; connected events, but the relationship need not be causal or even explained
- jdg - judgement, and evaluation (e.g., "ready" "enough")

DC -- Demand Complex

same as IC except that the form is one of a demand or question

III. Goal Directed Specific Behavior

IGO -- Input goal directed; planning and explanations

rs -- Reasoning
ps -- Problem solving

DGO -- Demand Goal Directed Behavior

rs -- Reasoning
ps -- Problem solving

IGS -- Input is general strategy for solving a problem or type of problem. It can involve a method such as measurement. The problem can be a social problem, and having a "talk". Emphasis is on the strategy.

pl -- Planning
alt -- Alternatives

DGS -- Demand General Strategy

pl -- Planning
alt -- Alternatives

III.

Level I. Teacher Input: Simple or Preparatory

CODE	BEHAVIOR	EXAMPLE
Io	1. Orienting Always an initiatory statement in a sequence. The sentence might be directions or a question and it is the relationship to the subsequent activity that makes it relevant.	"Now we are ready for work, Laura." "Let's see what's in here."
Ia	2. Anticipatory Patterning An attempt to orient the child to the future requirements or activities so that he can prepare and also develop a sense of sequence and time.	"In five minutes, when the big hand is here, it will be time." "Now we'll get the salt and then the soap and then the water."
Il	3. Labelling Basic naming of objects. Denotation	Says names of colors as they are given out.
If	4. Focusing Delimiting the relevant area for more precise or detailed attention. Usually follows a more general statement.	"You can see the roots of the plant down here. Notice those little white things."
Id	5. Describing Reporting perceptual details and/or qualities, and/or action.	"The front door is there, that must be the back door." While eating a grape: "Delicious, indescribably delicious."

Level II. Child's Response is Demanded by Teacher Stimulus. Simple

IIe	1. Labelling	"What color is this?" "Show me the yellow one."
IIf	2. Focusing	When looking for differences: "Show me which part is different. Look closely."
IId	3. Describing	"What is he doing? Tell me about it."

Level III. Teacher Input: Complex

IIIdf	1. Defining function	"A bulldozer is a machine to move dirt and push heavy things."
IIIdt	2. Defining thematic-relational	"A family has a mother and a father and children all living together."
IIIE	3. Elaboration Usually after a denotative or defining statement which is then enriched.	"That's the big hook and ladder. That's the biggest fire engine of all."
IIIR	4. Relationships: Comparisons Similarities and Differences	"They are all purple except one." "These two envelopes say the same word."
IIICF	5. Simple Reasoning: rudimentary concept formation. Cause and effect. Logical consequence but without the formal structure implied in Levels V and VI.	"The longer you roll, the longer and thinner it will get." "Squeeze the sponge so not so much water - you'll slip if you have water on the floor."

Level IV. Child Demanded Response to Specified Cognitive Operations

IVdf	1. Defining by Function	"What is this used for — what does it do?"
IVdt	2. Defining by theme and relation	

Level IV (cont'd)

IVE	3. Elaboration of detail	A probing question which would follow an initial request for a label or description. "Tell me more about your picture." "Why did he do that? Tell me about it."
IVR	4. Relationships	"Which one is just like the other?" "Find another one with the same color."
IVCF	5. Concept Formation Simple reasoning, cause and effect	"Where can we find the biggest, the largest?" "How many are there?"

Level V. Teacher Strategies related to goal-directed behavior

V comp.r.	1. Complex reasoning May include other types of logical constructions, but they are combined in a way to make a point — goal-directed. The goal is less specific than that in problem solving.	While making a pinata: "The balloon gives us the shape, so that we will have a nice round shape... remember the yarn. It was just yarn and then we put it in paste and it kept its shape, and now the newspaper will keep the balloon shape."
V SqCh	2. Sequential Chains Emphasis is upon the necessary sequential nature of two events, linked to a point which the teacher is trying to explain.	"No, the water instead of staying, of hitting the top of the jar — there won't be any cover so it will just get mixed in out air. But if you keep it covered, then the water will stay in."
V Prob	3. Problem Solving The thought process is linked to a specific, goal-defined need in an attempt to find a solution.	After having spilled water on the floor: "Mrs. Jones spilled it on the floor — that's why I put the paper there."

Level VI. Child Demanded Response of strategies to a goal, but with unspecified means

VI cmp.r. 1. Complex Reasoning
Less immediate or specific consequences, than SqCh. Also includes analogies, references to other situations, etc.

"What would happen if I put the mouse way up high in the tree? Could he live up there?"

VI SqCh 2. Sequential Chains
More immediate and limited in scope than comp. reas.

"What would happen if we put clay on the table after juice spilled and we didn't wipe it up?"

VI Prob 3. Problem Solving

"What kind of juice is it — without tasting it?"

Level VII

VII Strat 1. Coaching on Strategy
Teacher indicates a general technique for solving a problem.

"Don't taste it. You could smell it, or look at the color."
"Well, bring them in; we'll plant them and see."
"You don't say 'J-I-M', we say JIM; we don't say 'A-T'. We say AT; we put it together."

VII Alt 2. Alternative solutions

"Do you have a fire engine? Do you want one? Well, you could line up chairs to make one or build one out of blocks."

APPENDIX B

ORIGINAL CODING CATEGORIES: TEACHER OBSERVATION

Behavior Related to Cognitive Development

I. Activity Area

1. Free play inside
2. Story
3. Art and/or projects
4. Organized games
5. Snack
6. Organized learning situation
7. Outside

II. General Areas of Communication

1. Affiliatory
2. Help
3. Seeks information (not cognitive)
4. Reinforcement - reward
5. Preparation for an activity
6. Reflection and Interpretation of others feelings
7. Reflection of own feelings and motives

III. Cognitive Area - Verbal (see Appendix A)

IV. Control Strategies - Verbal

A. Simple

1. Command
2. Options: a) request b) motivate c) alternatives
3. Permission

B. Complex - with reasoning

1. Command
2. Options: a) request b) motivate c) alternatives
3. Permission - qualified or with reasoning
11. Command, status rules
12. Command, personal-social
13. Command, cognitive-rational
21. Option, status rules
22. Option, personal-social
23. Option, cognitive-rational

Additional Summary Judgements: Scales 1-4 Areas Affecting Cog. Dev.

V. Degree of Differentiated Organization in the Room (Home)

1. Definite organization of time with activities
2. Clearly organized play equipment - arranged for child's access and responsibility
3. Clearly established (authority) roles
4. Definition and differentiation of activity areas: quiet, active, art, books, etc.

VI. Macro-teaching technics which may foster Cognitive Development

1. Individuation
2. Follow-through in cognitive learning: preparation, teaching, repetition, and recall
3. Enrichment - diversity of experience
4. Encouragement of child to assume responsibility in choice of tasks and play